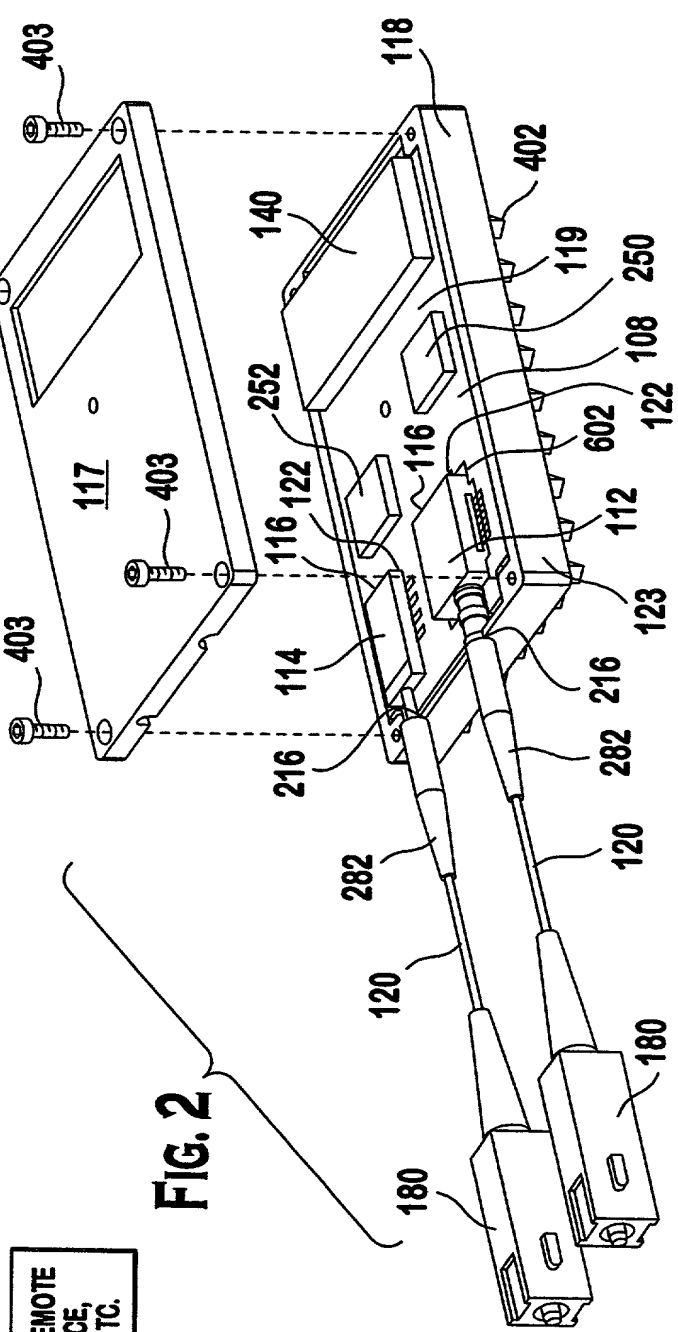


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**FIG. 4**

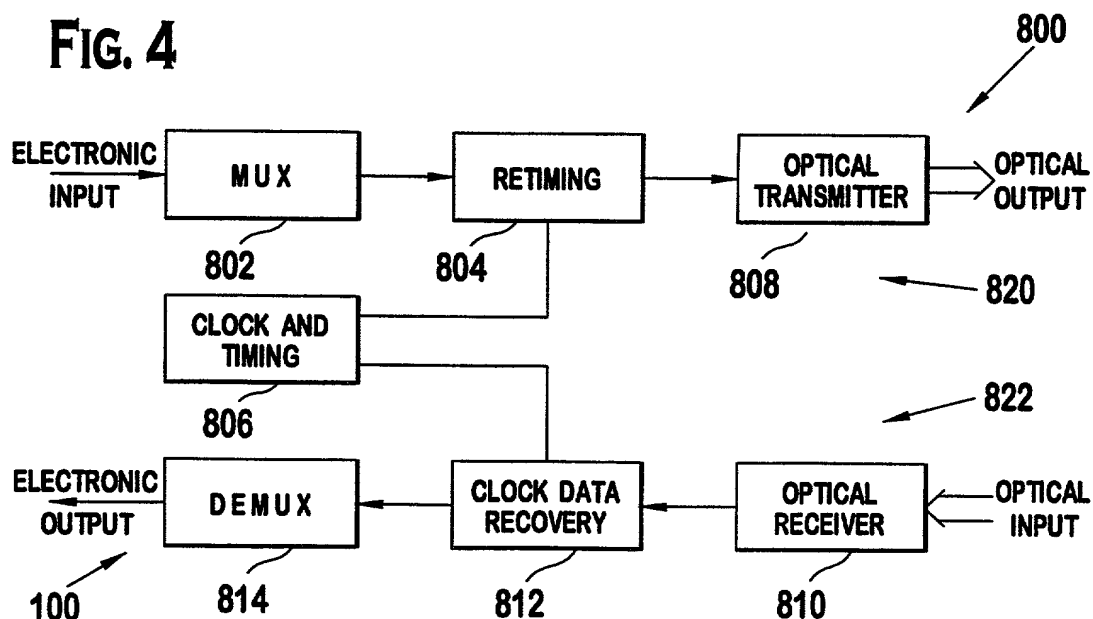


FIG. 5

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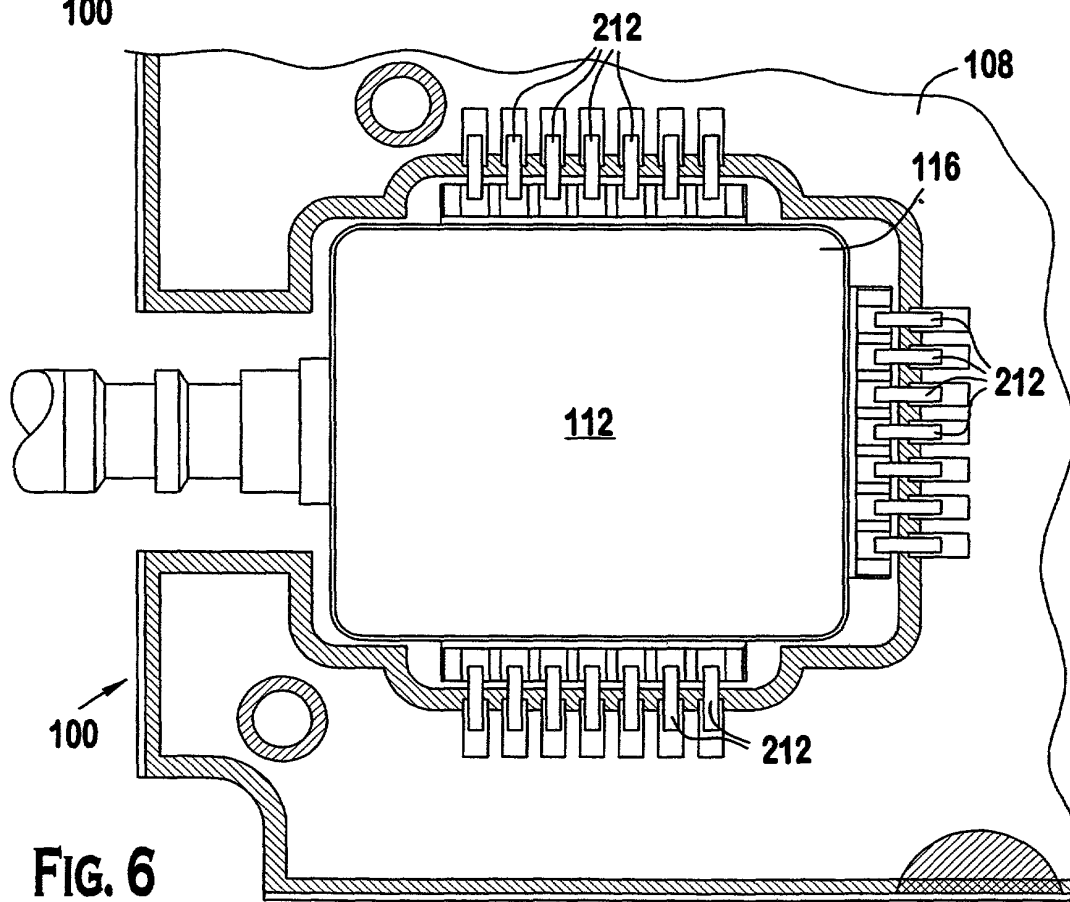
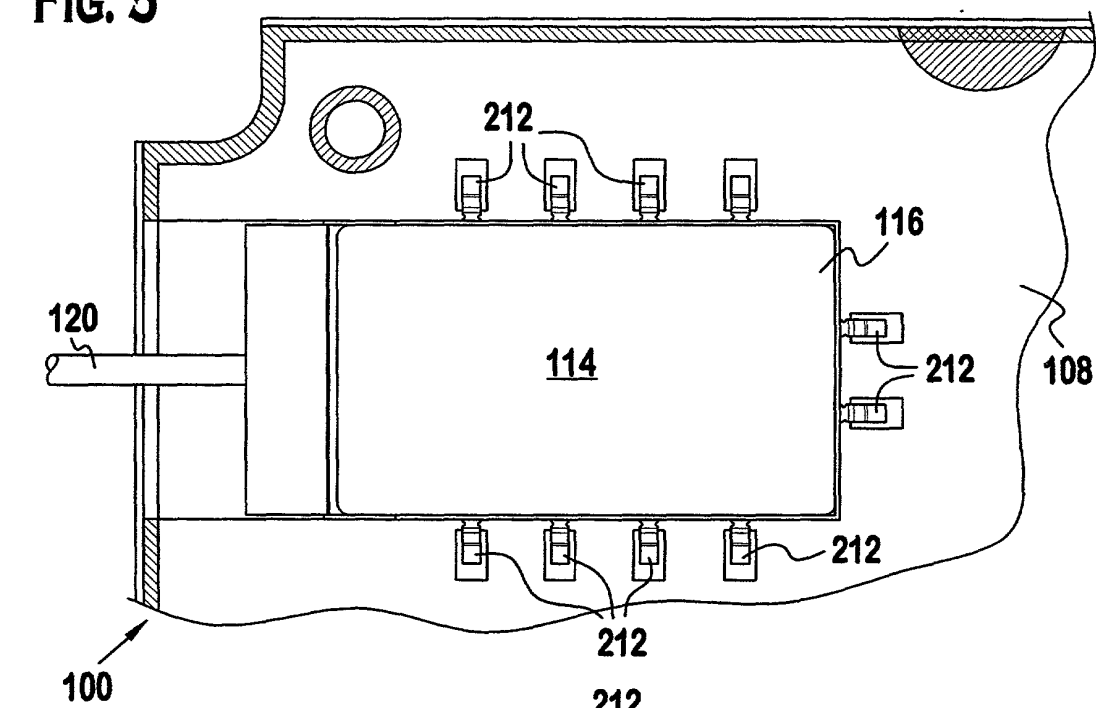


FIG. 6

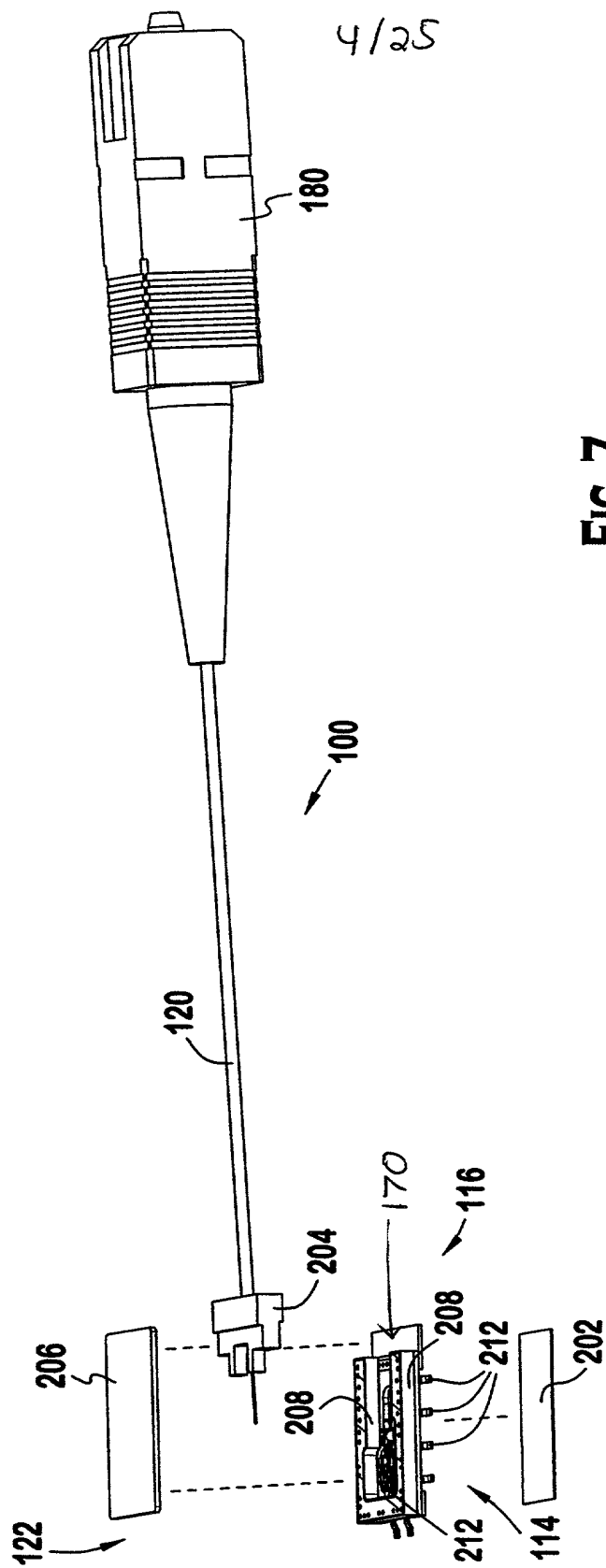
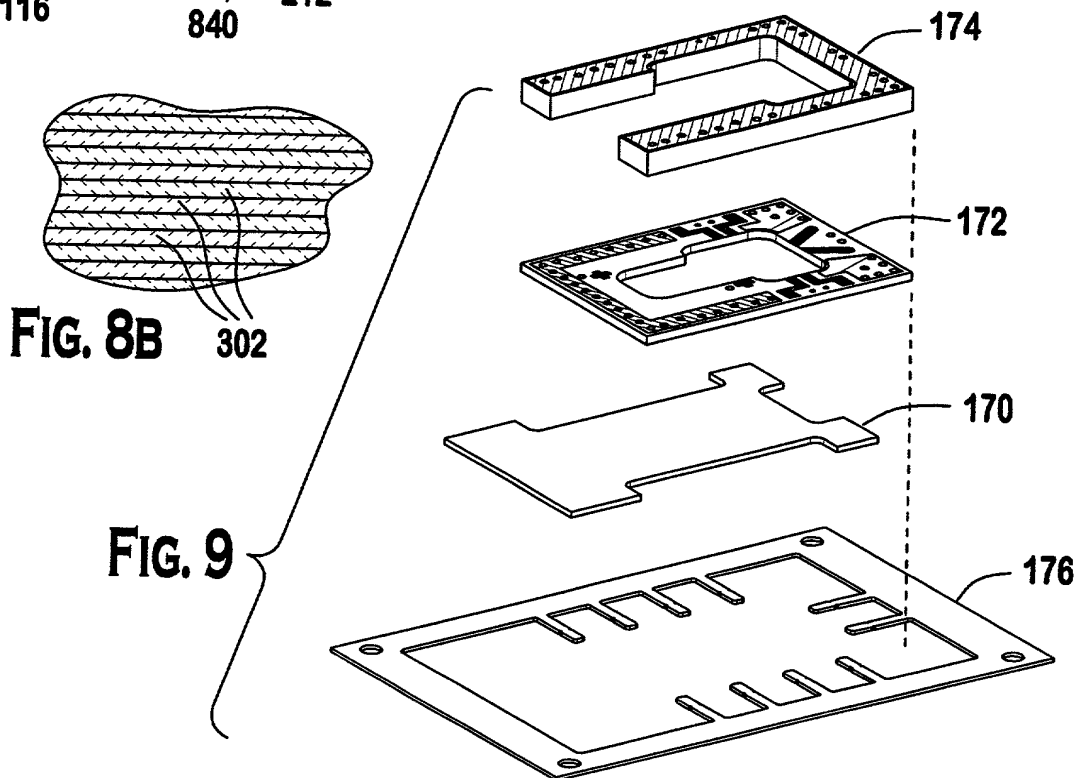
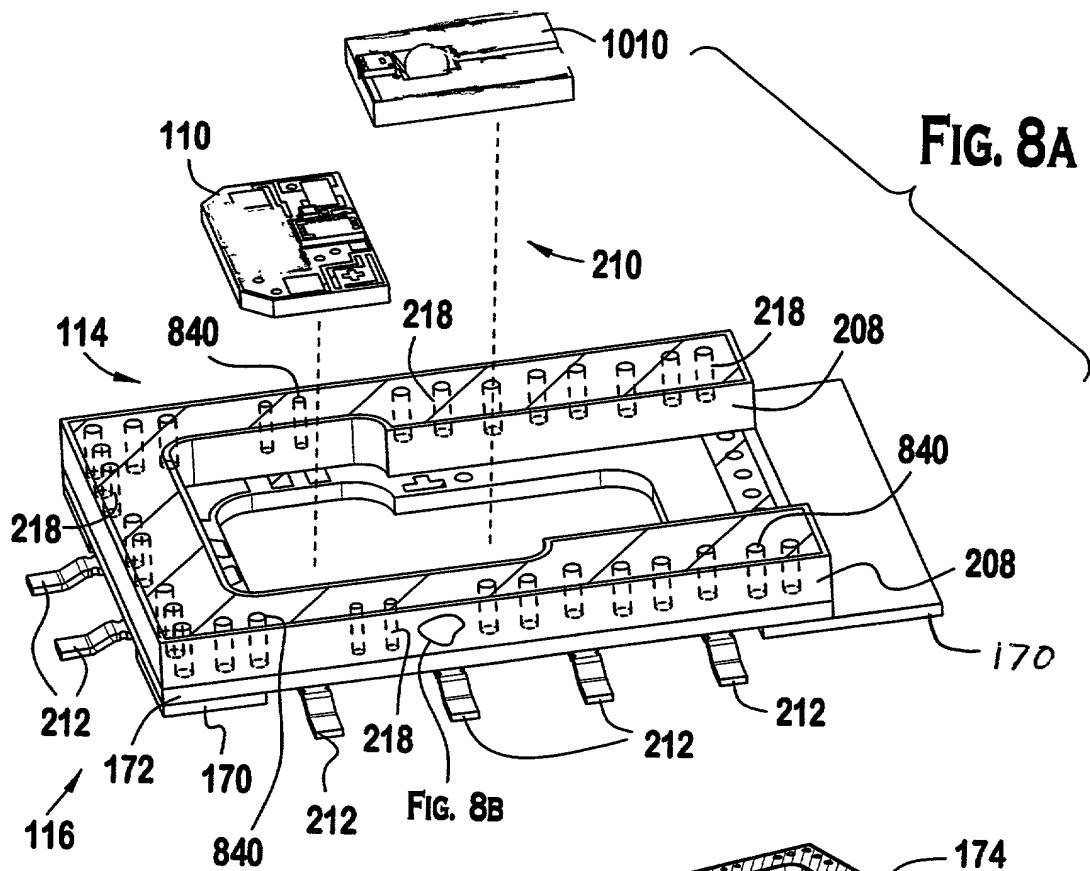
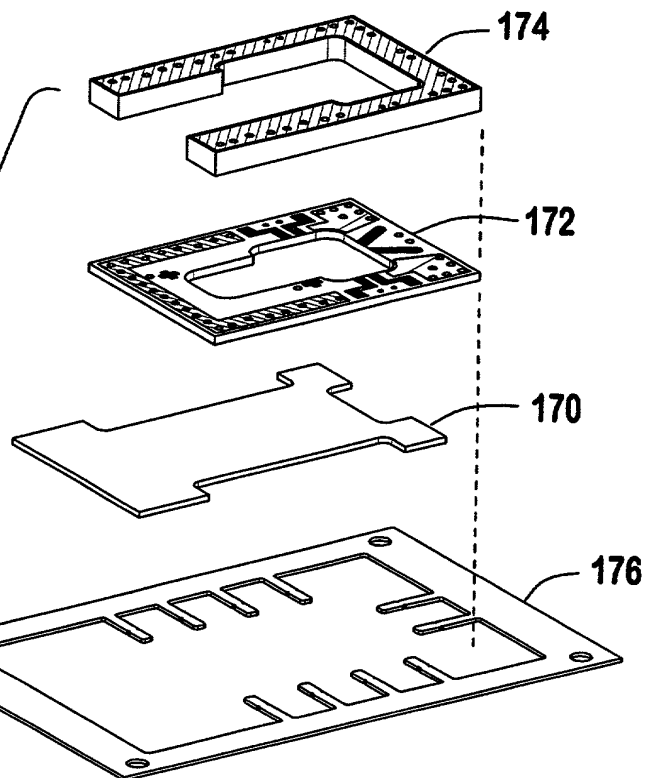


FIG. 7

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**FIG. 9**



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FIG. 10

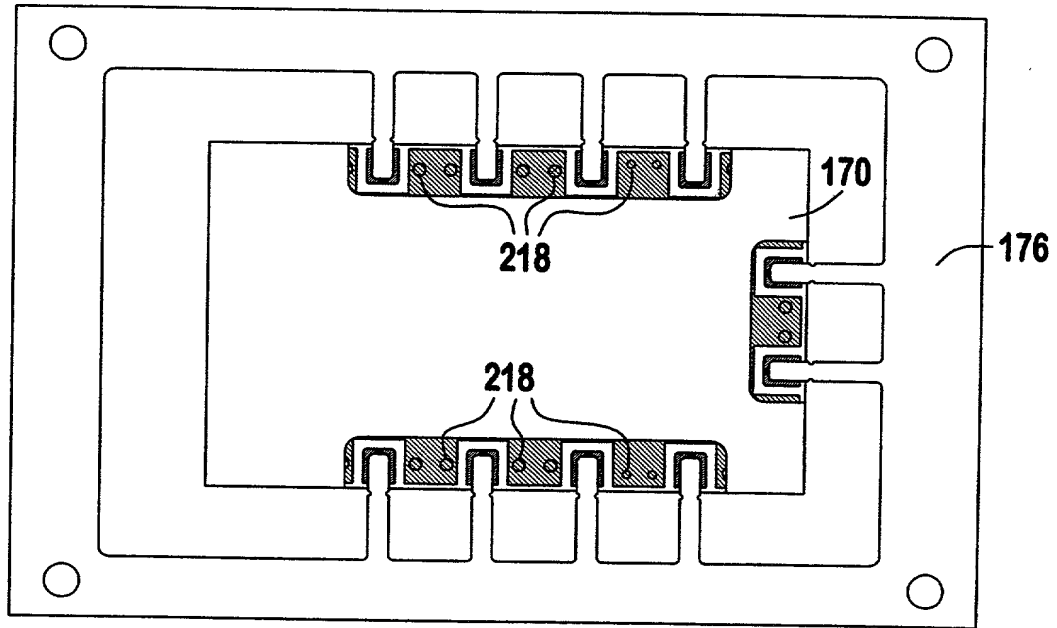
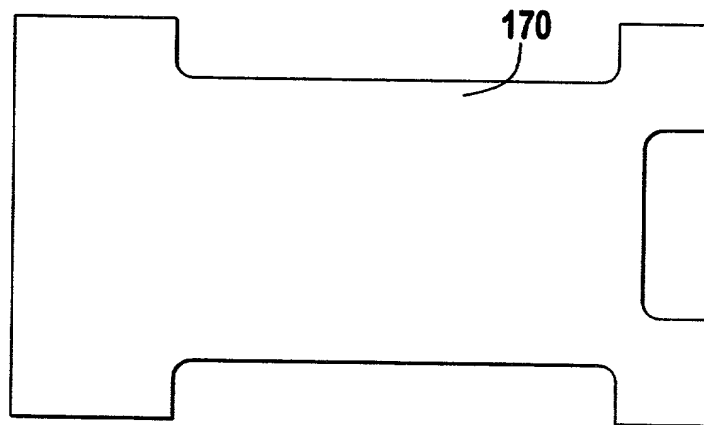


FIG. 11



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FIG. 12

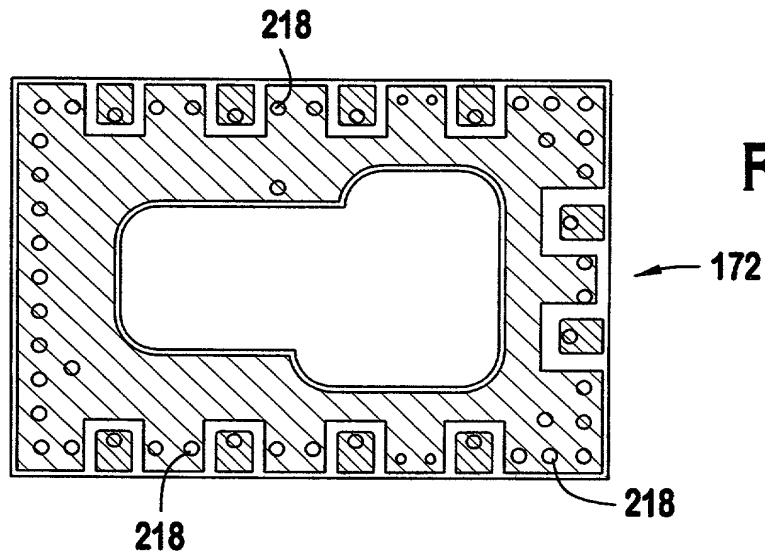
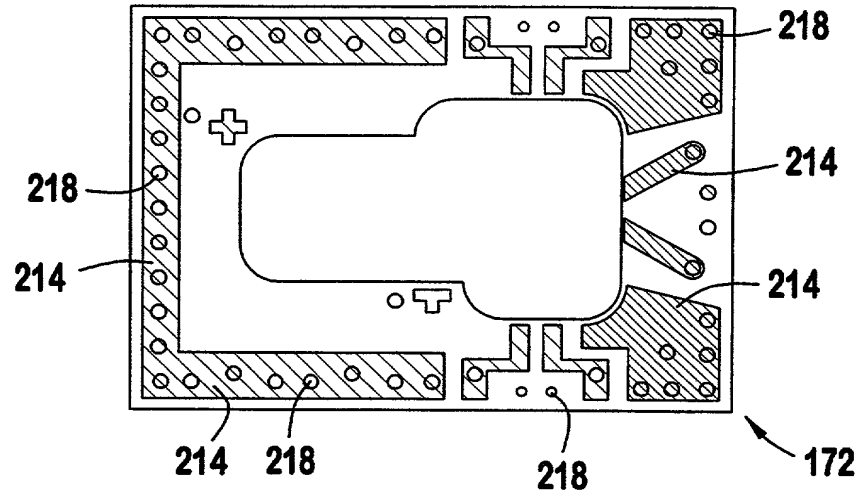


FIG. 13

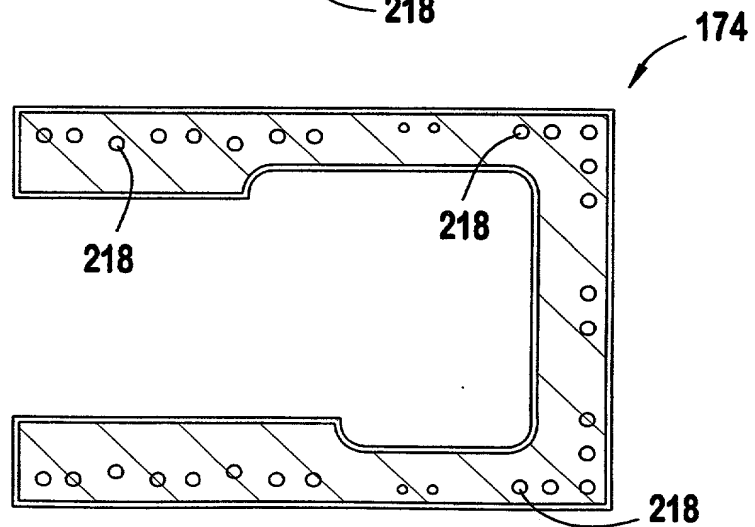


FIG. 14

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FIG. 15

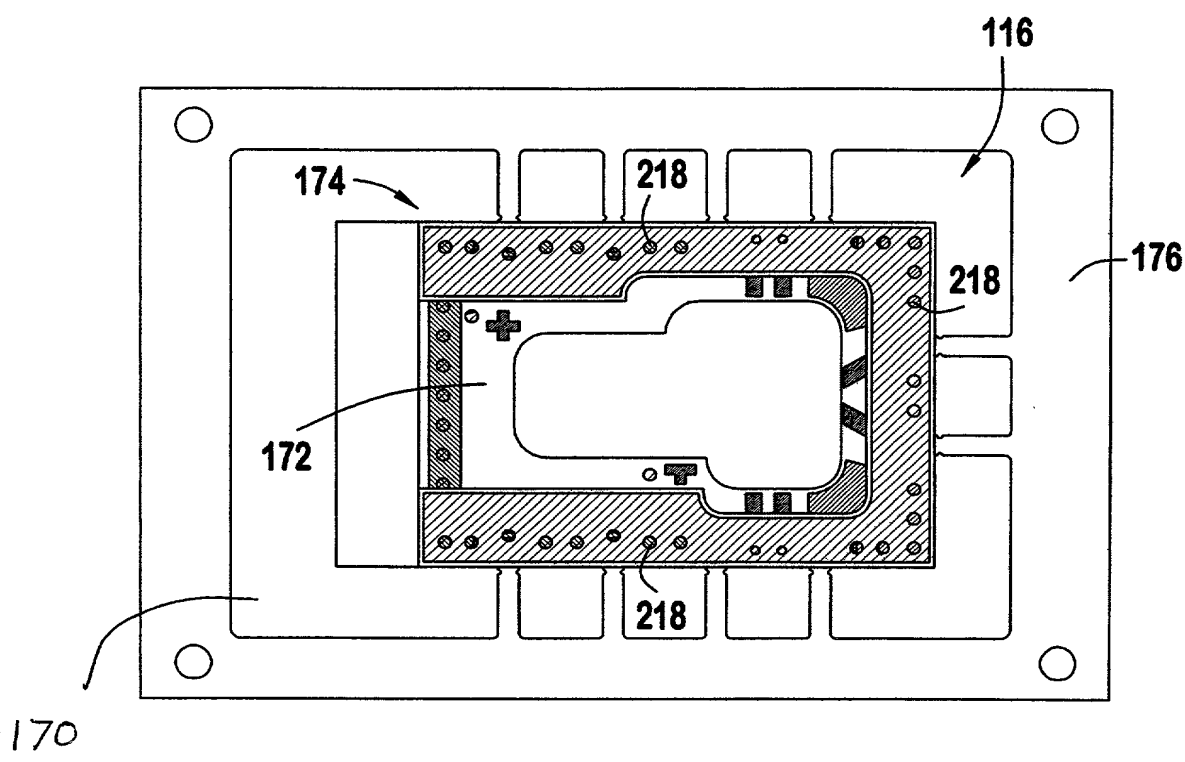
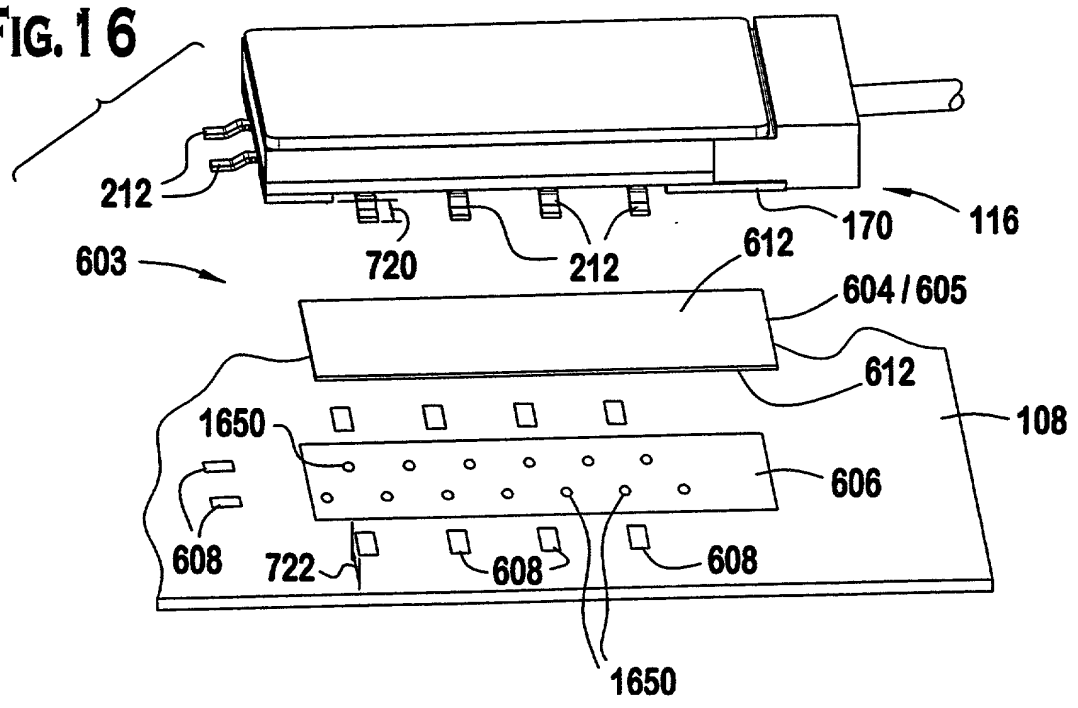


FIG. 16





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FIG. 17A

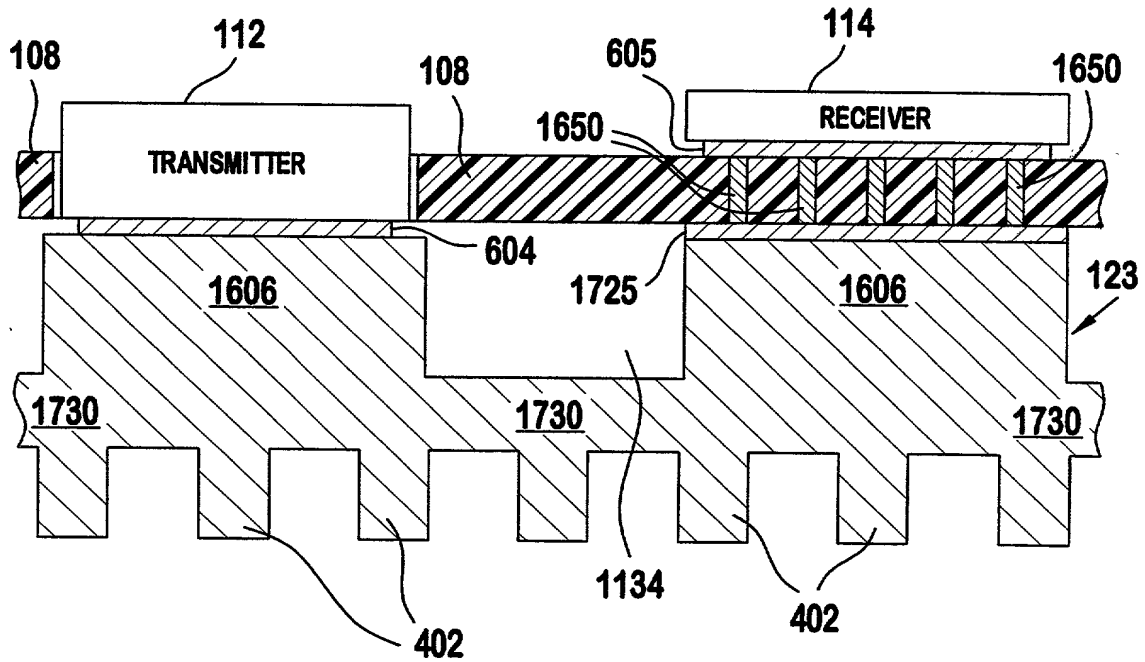
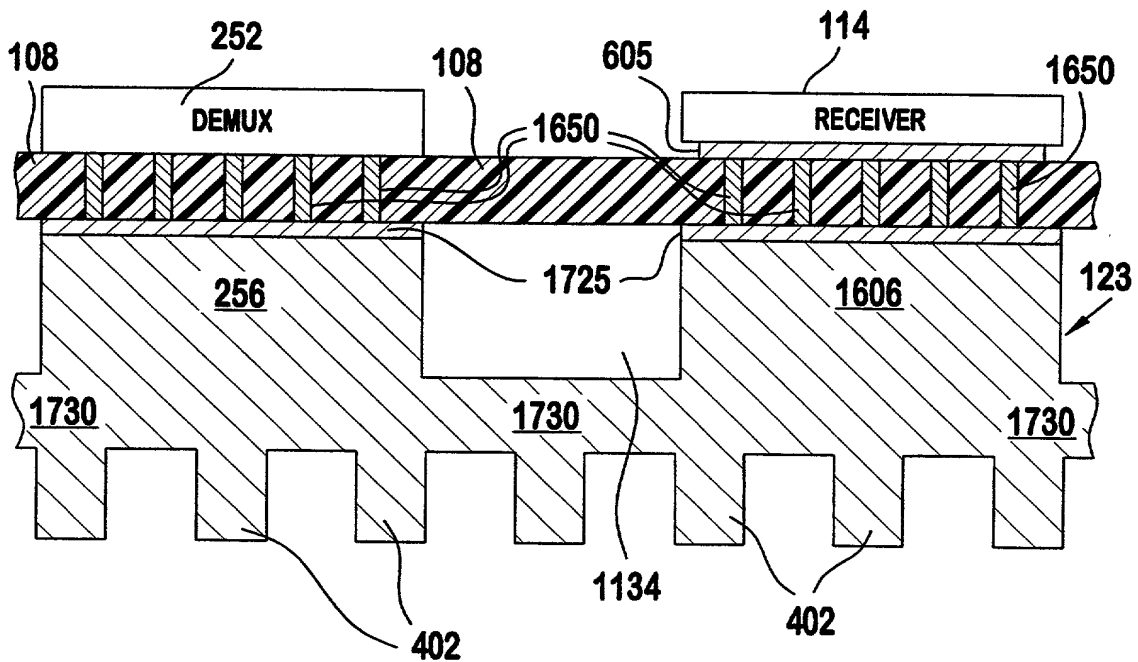
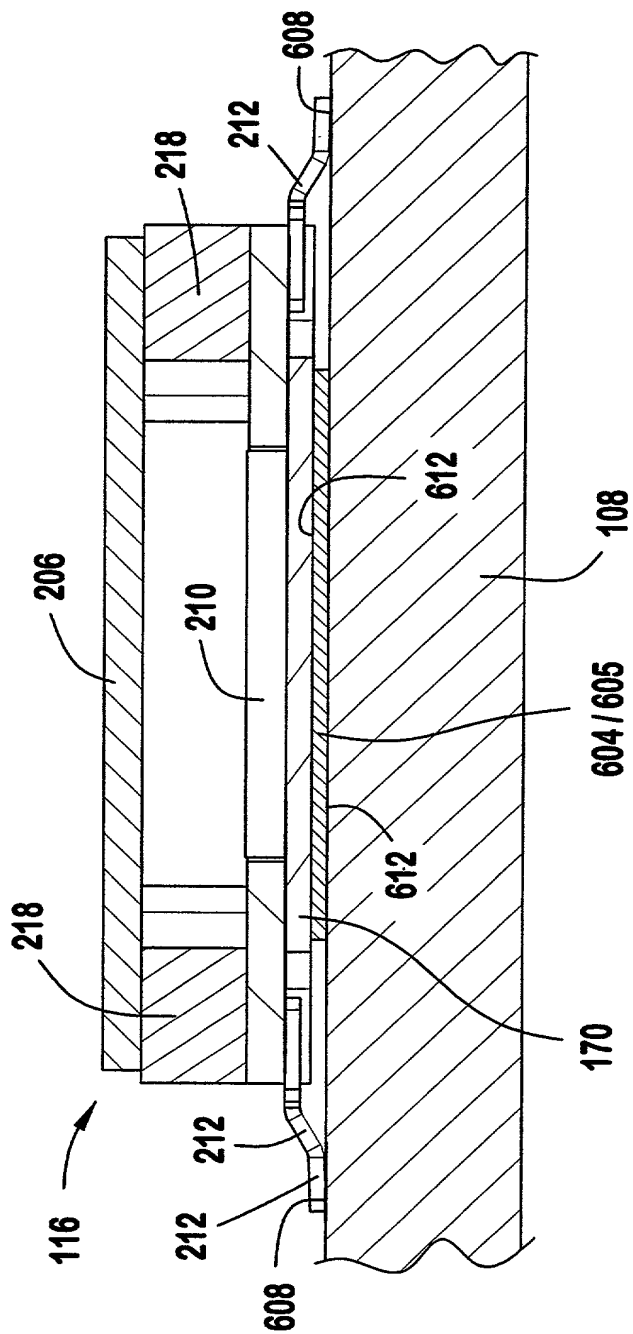


FIG. 17B



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FIG. 18



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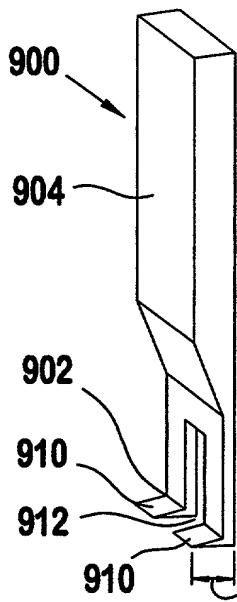


FIG. 19A

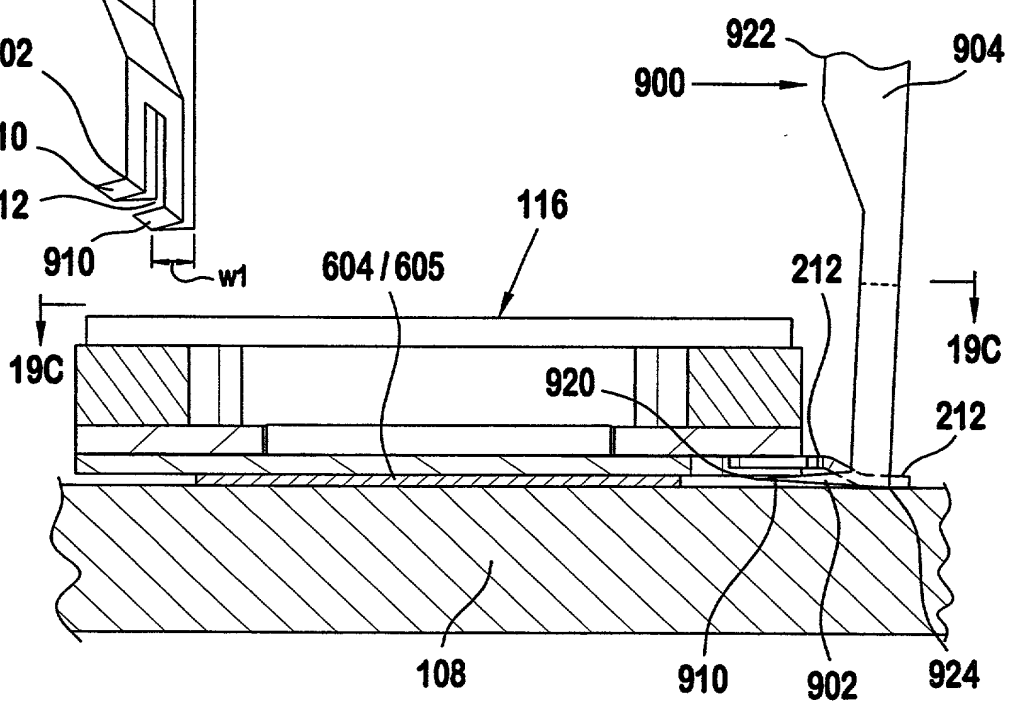


FIG. 19B

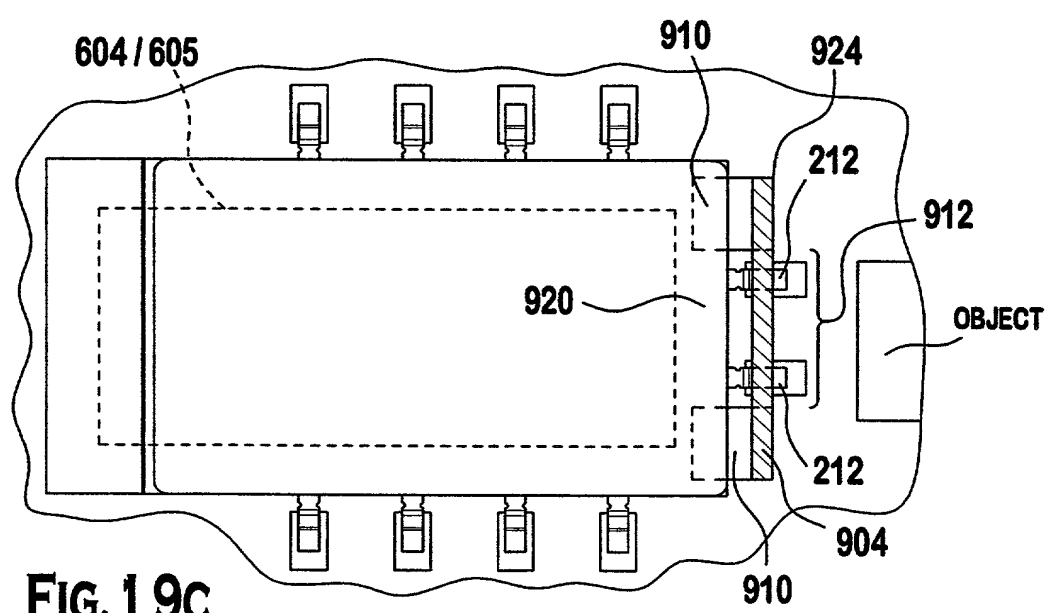


FIG. 19C

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FIG. 20B

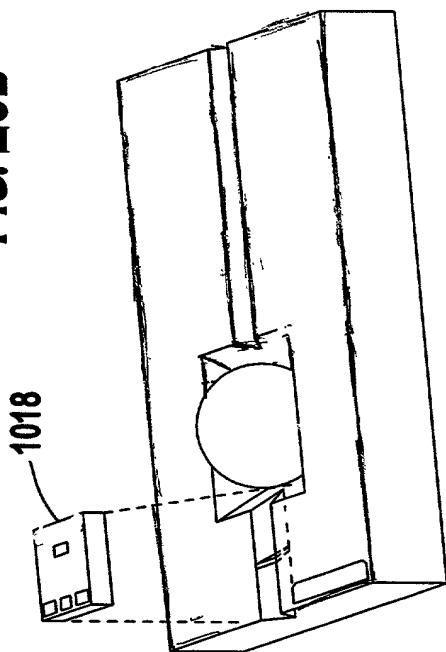
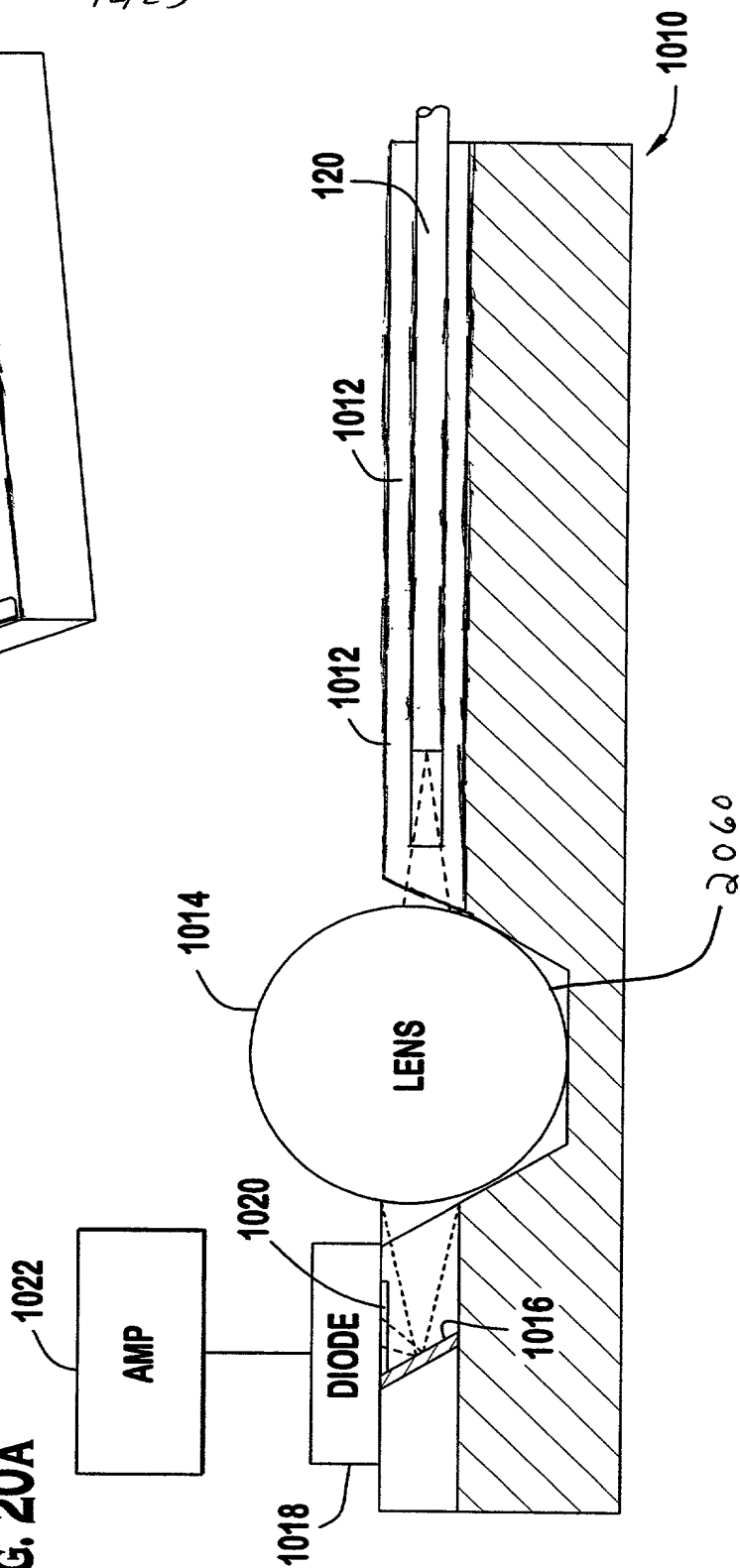


FIG. 20A



3600

112

FIG. 21

208

- 202

1119

**2115**

122

212  
170/203

212

**112**

208

- 122

214

110

1.

60

34

214

1108

[illegible]

115

— 112  
1110

-1118

\_\_\_\_\_

--	--	--

--	--	--



1110

1110

10

1126

---

---

= 212

— 212

- 1112

1119

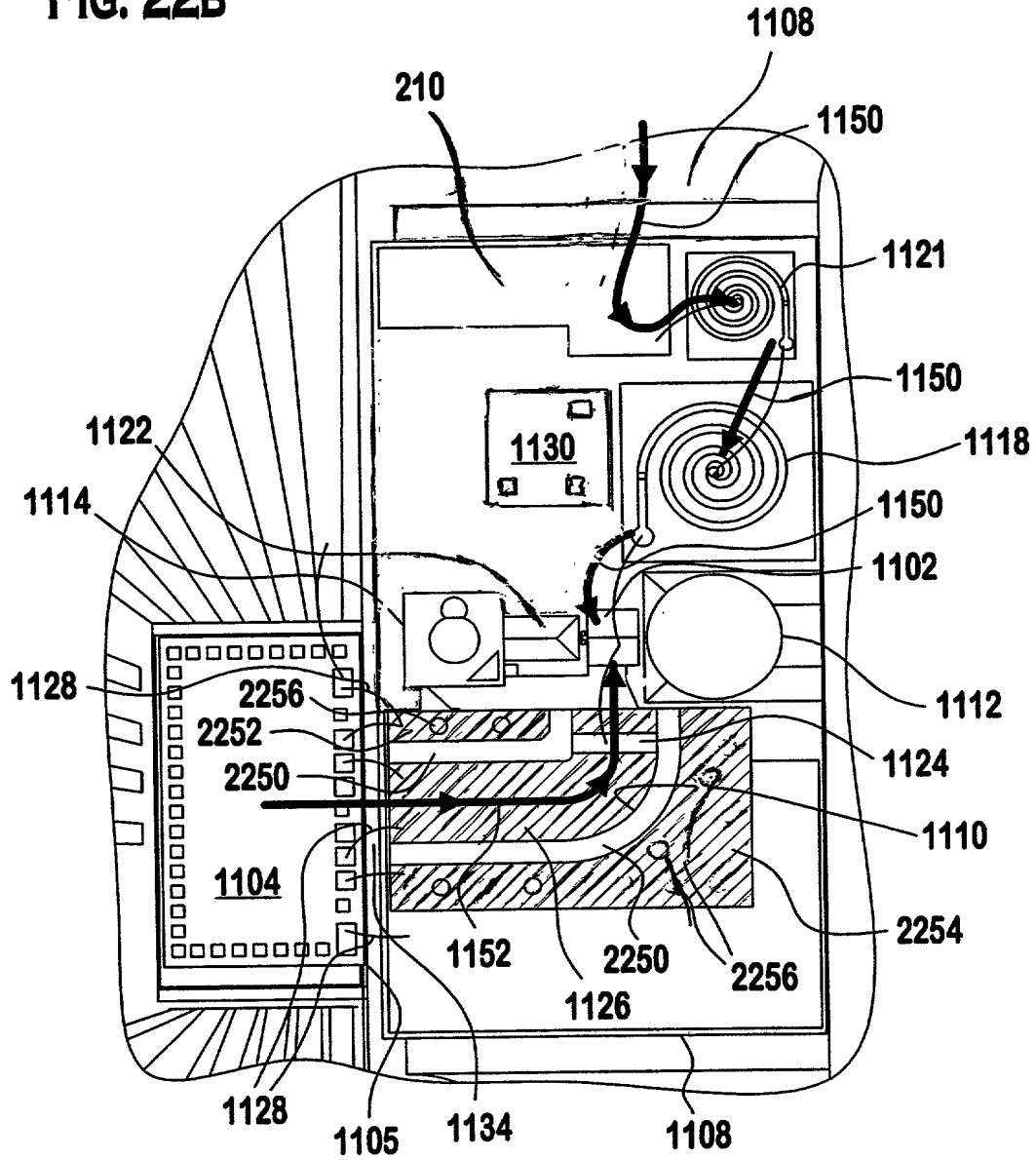
**-1102**

≡ 212

**FIG. 22A**

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FIG. 22B



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FIG. 22C

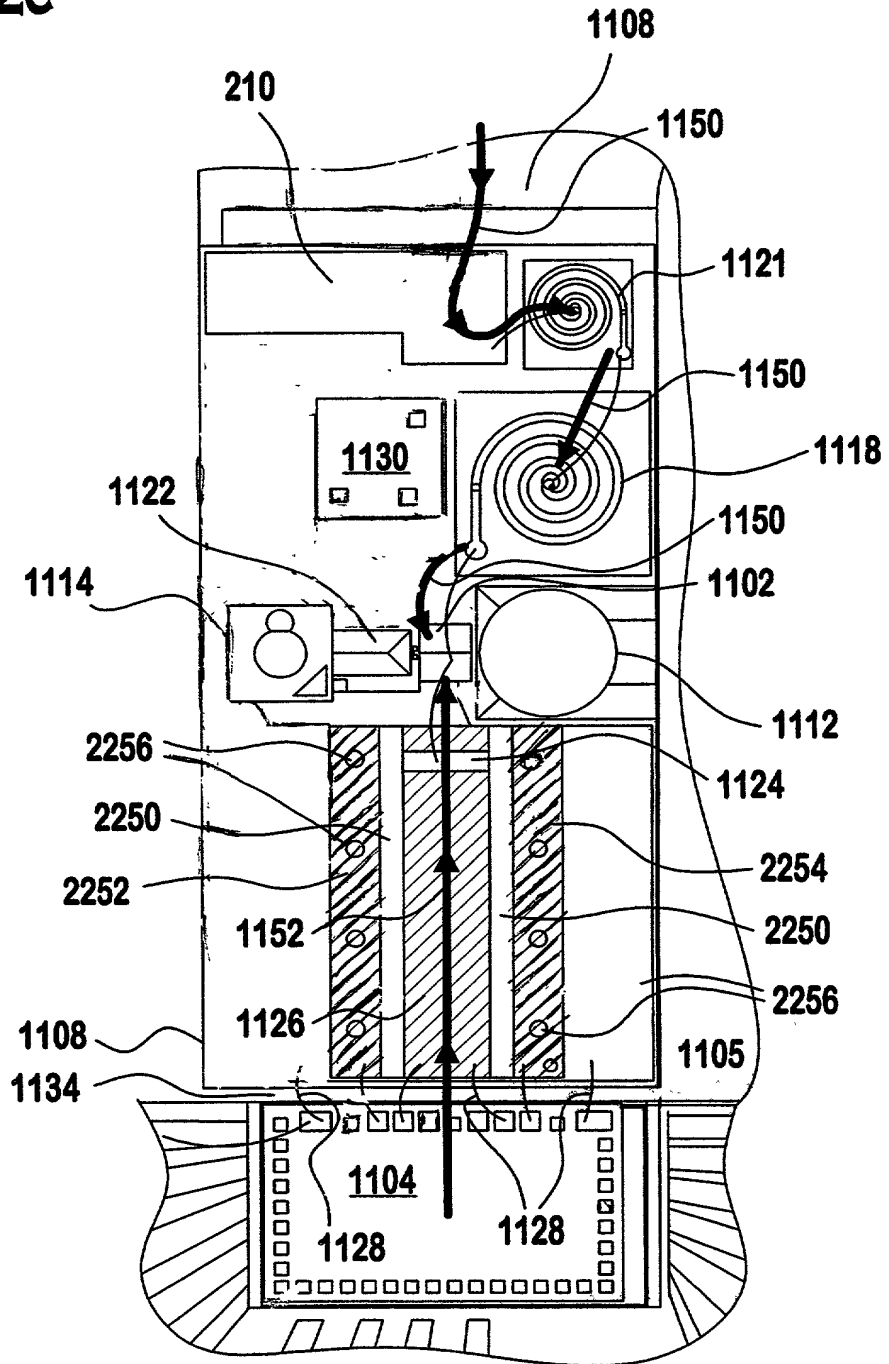
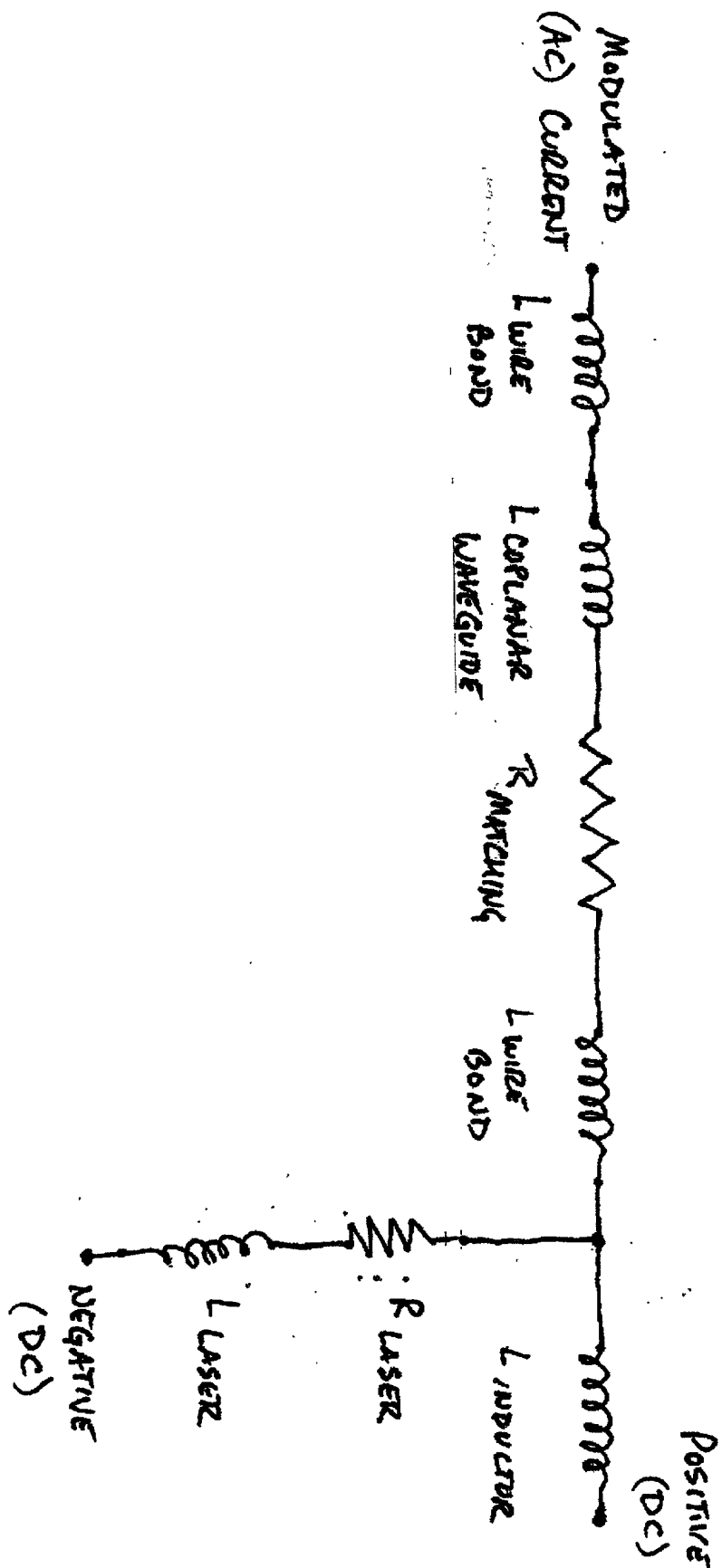


FIG 22D



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TEMP<sub>CURVE 1</sub> > TEMP<sub>CURVE 2</sub> > TEMP<sub>CURVE 3</sub>

FIG. 23

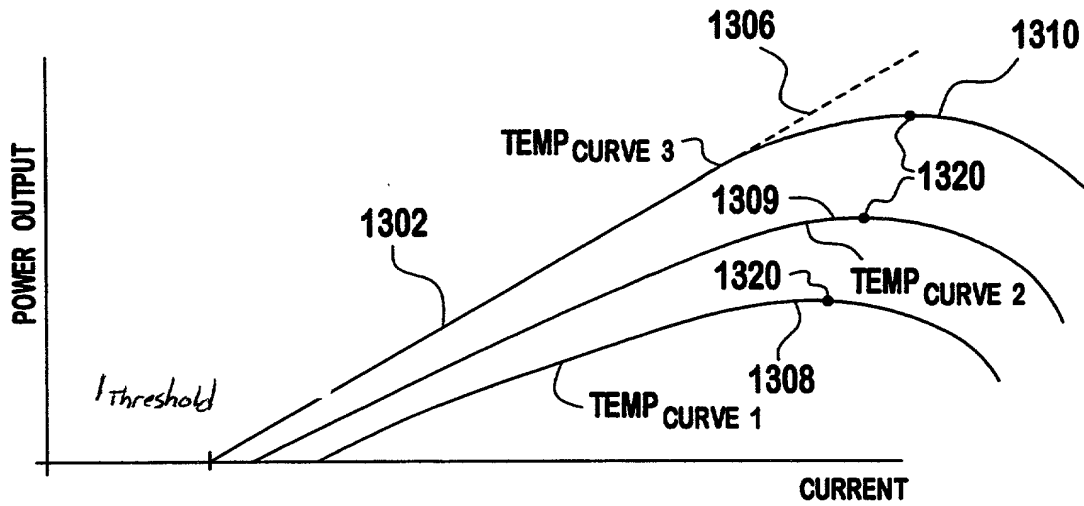
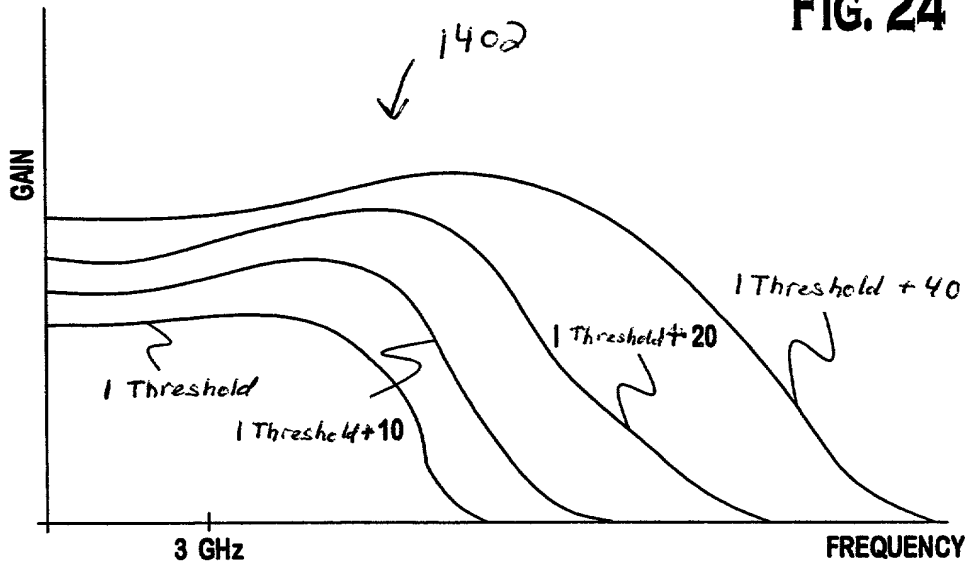
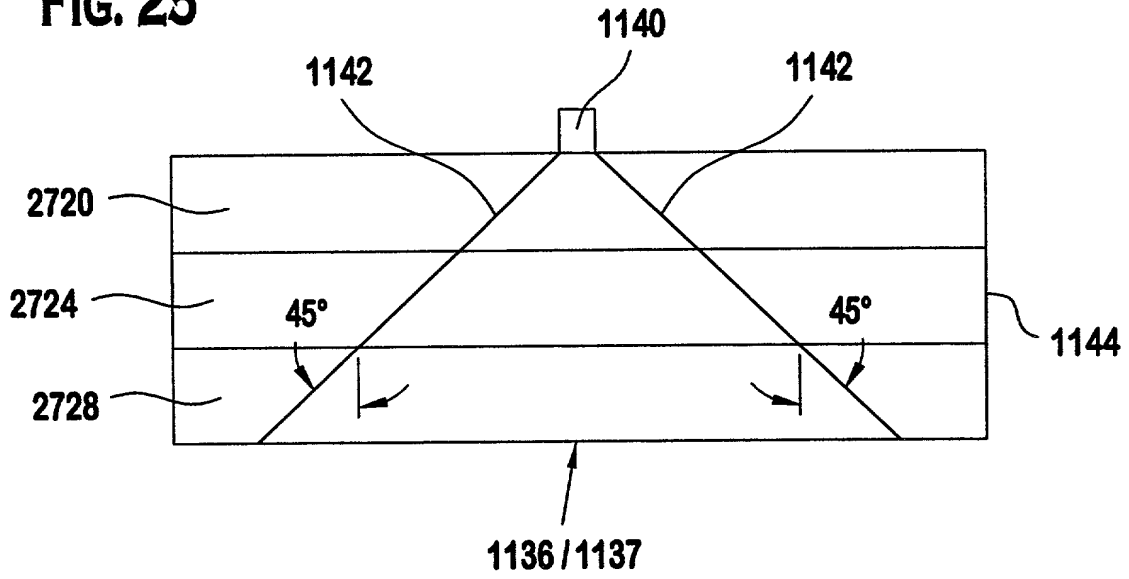


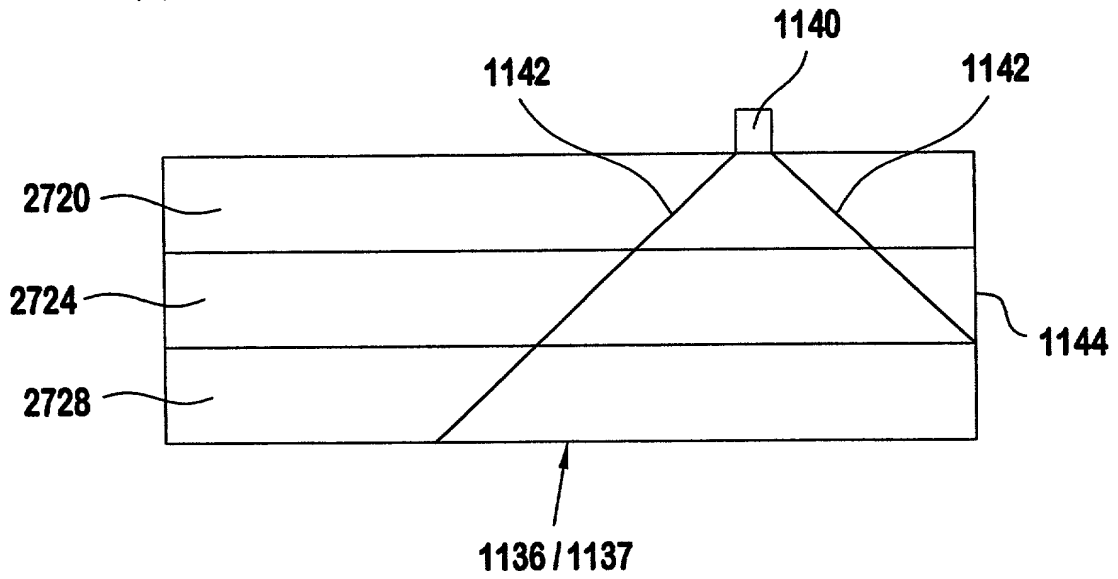
FIG. 24

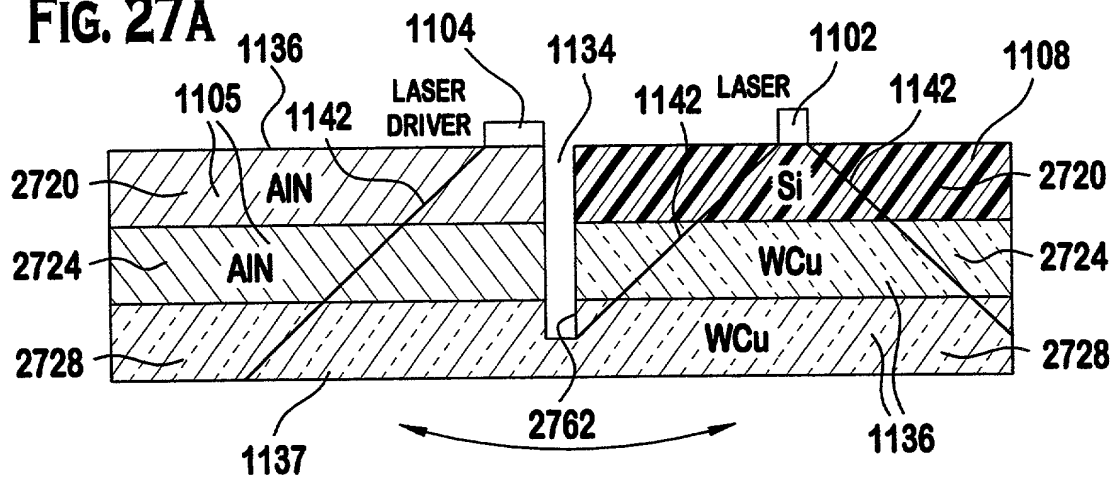


**FIG. 25**



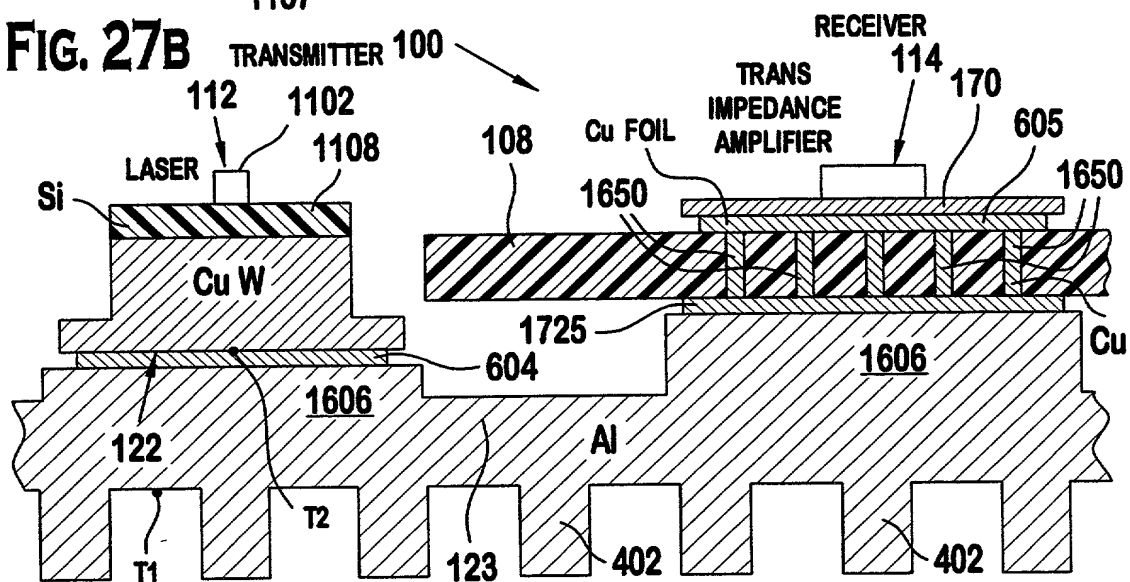
**FIG. 26**





**FIG. 27B**

This cross-sectional view shows a transmitter (100) and a receiver (114) integrated on a common substrate. The transmitter (100) on the left includes a Si layer, a LASER (112), a Cu W layer (1102), and a Si layer (1108). The receiver (114) on the right includes a TRANS IMPEDANCE AMPLIFIER (170) and a Cu FOIL (1650). Both components are connected to a common ground plane (1606) via vias (122, 123) and pads (1725, 1604). The ground plane is supported by a T2 layer (123) and a 402 layer (402). The entire assembly is mounted on a substrate (1606).



27c

TRANSMITTER 1104

1102

1108

Si

605

1606

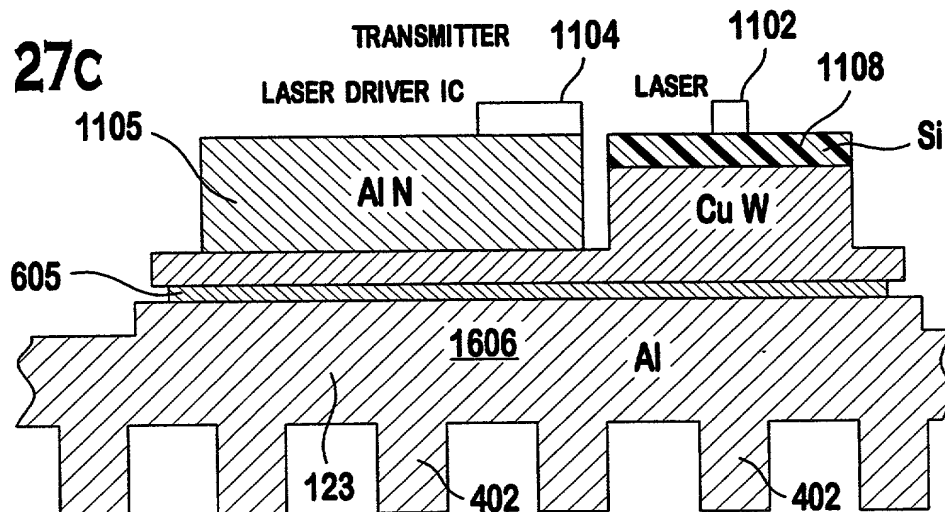
Al

123

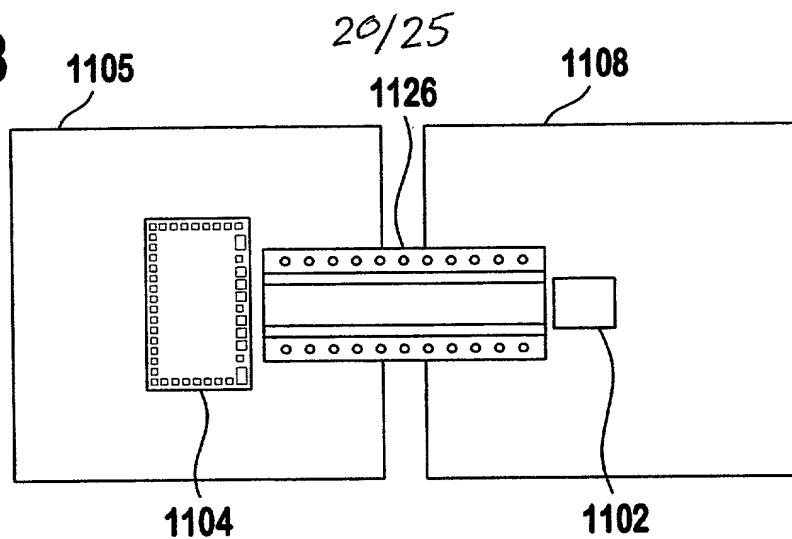
402

402

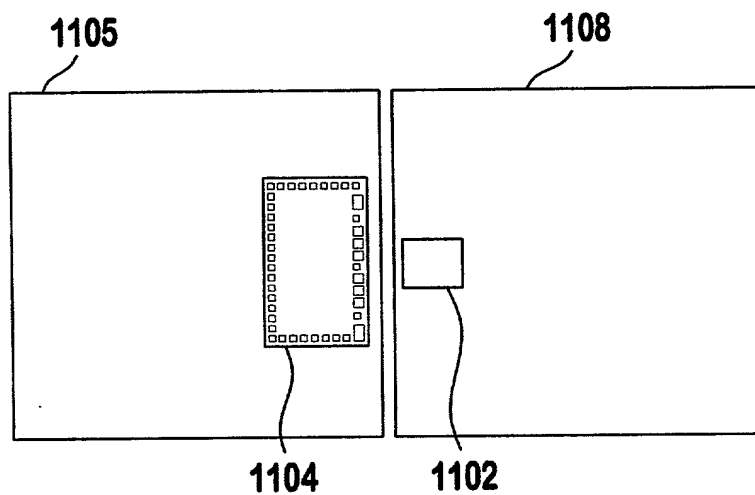
Diagram 27c is a cross-sectional view of a semiconductor device. It shows a substrate with a patterned layer 1606 (Al) and a layer 605. On top of 605, there is a large block of AlN (1105) and a smaller block of Cu W (1108). A LASER DRIVER IC (1104) is mounted on the AlN block, and a LASER (1102) is mounted on the Cu W block. The device is labeled 27c.



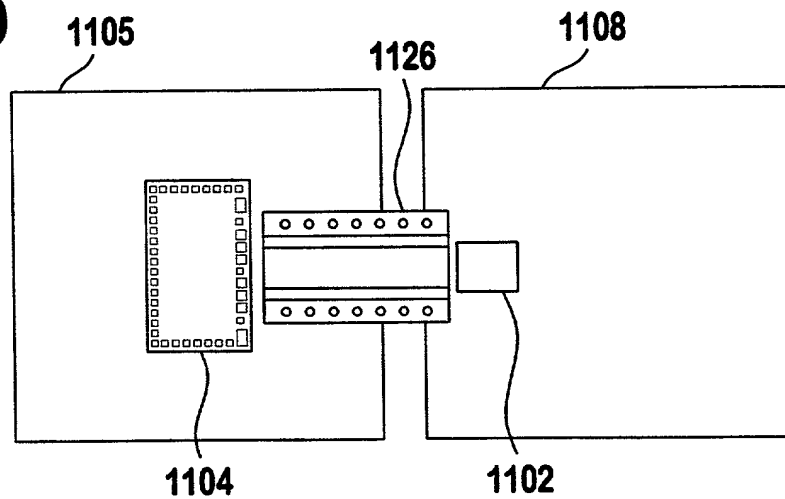
**FIG. 28**

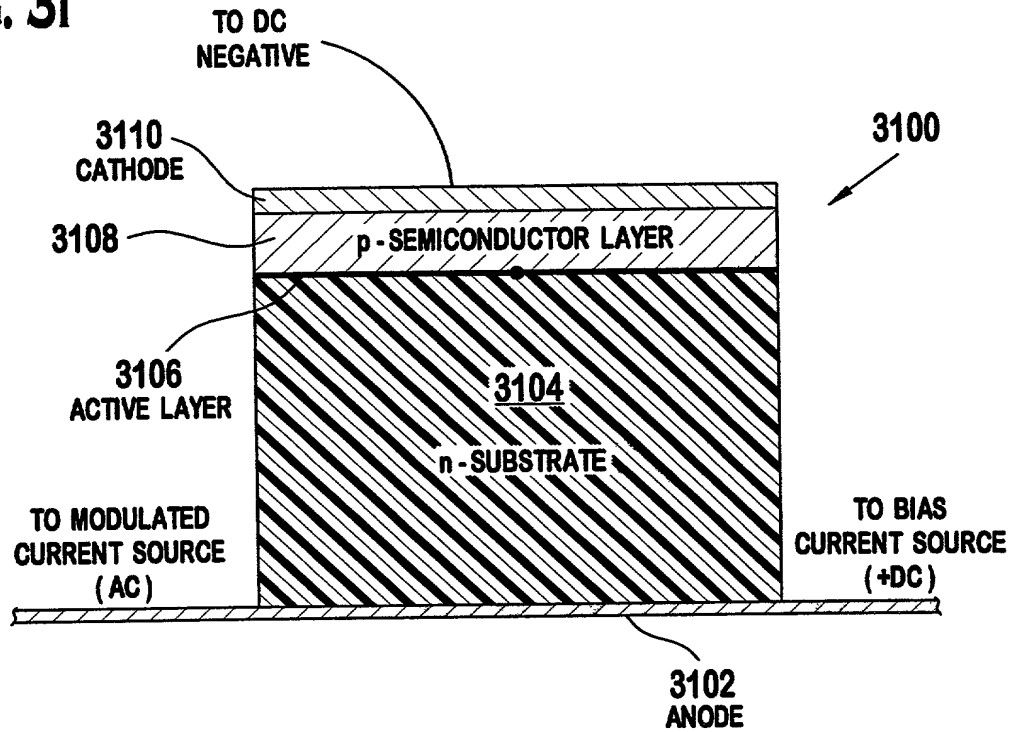
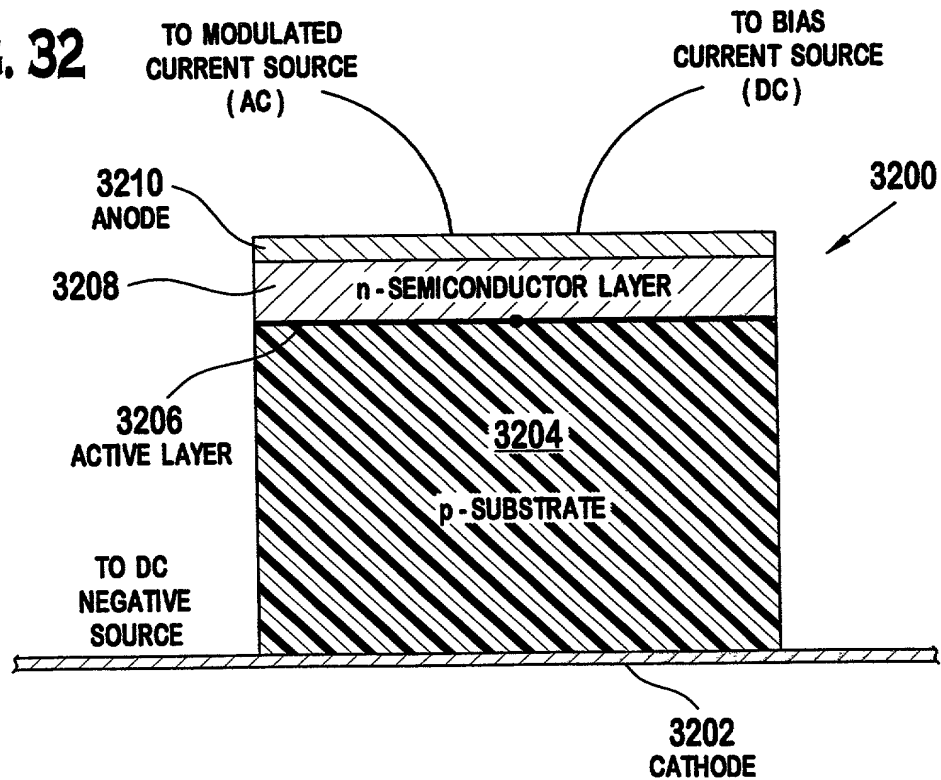


**FIG. 29**



**FIG. 30**



**FIG. 31****FIG. 32**

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FIG. 33A

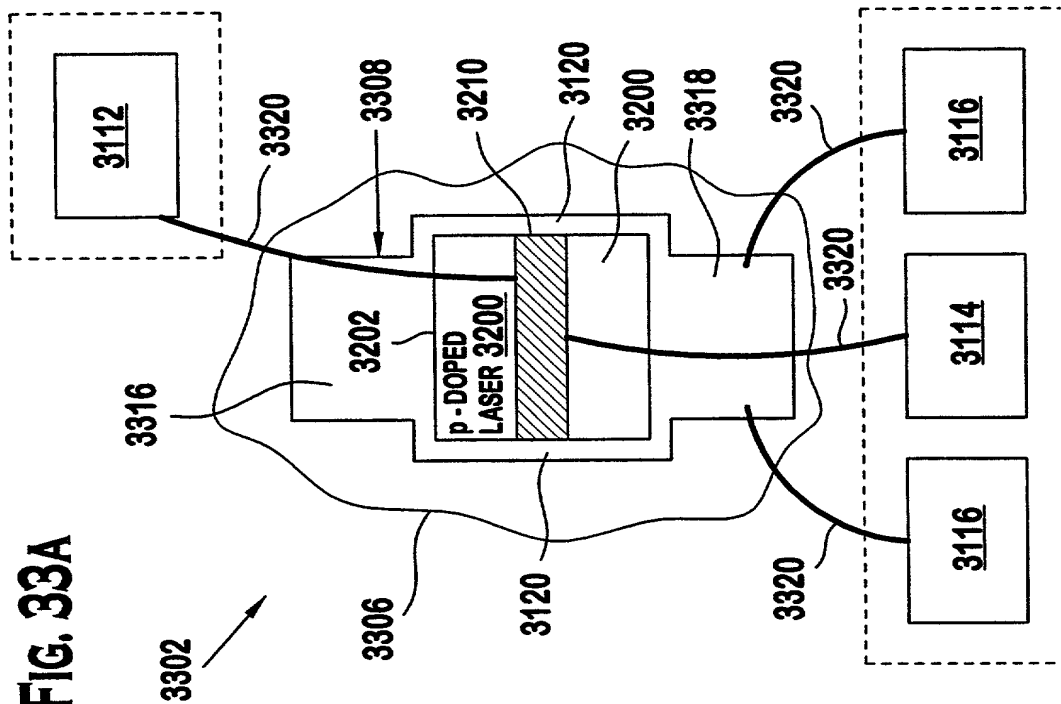
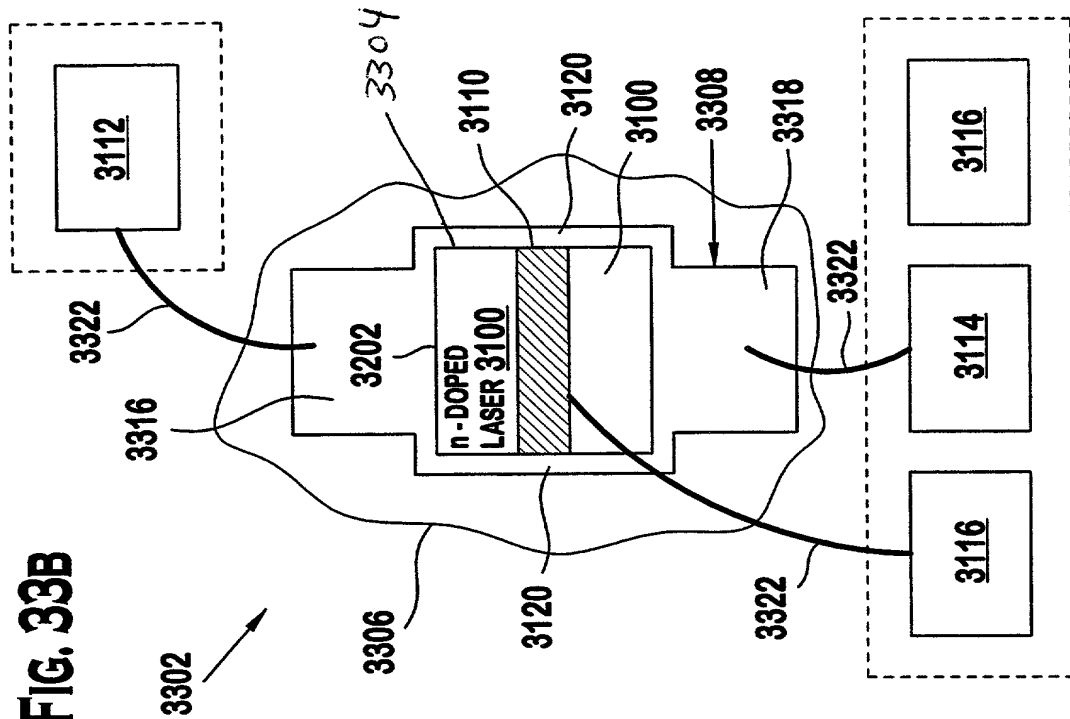


FIG. 33B



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FIG. 34

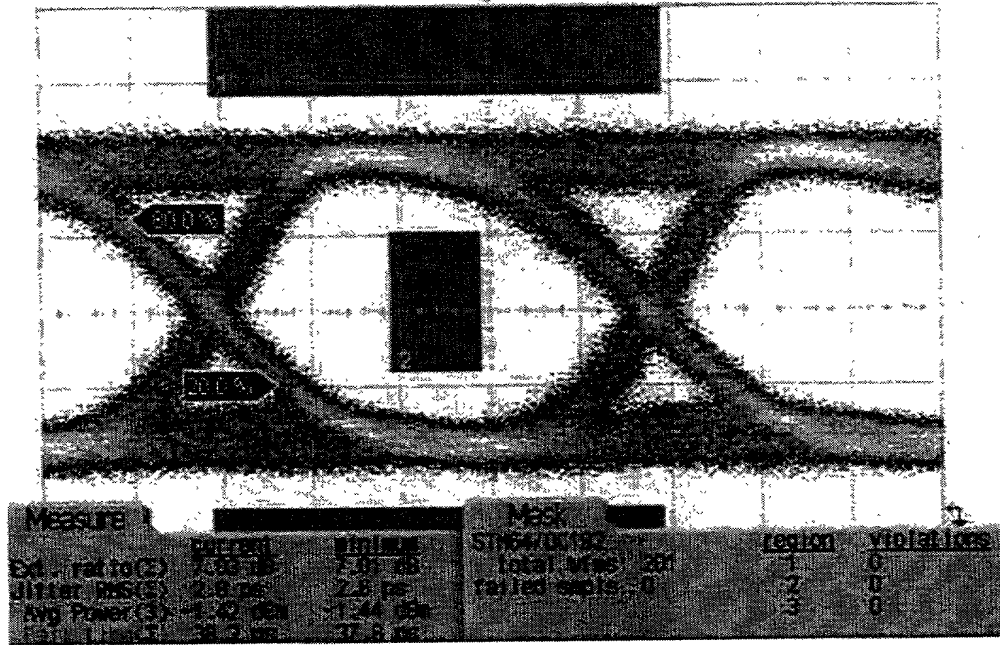
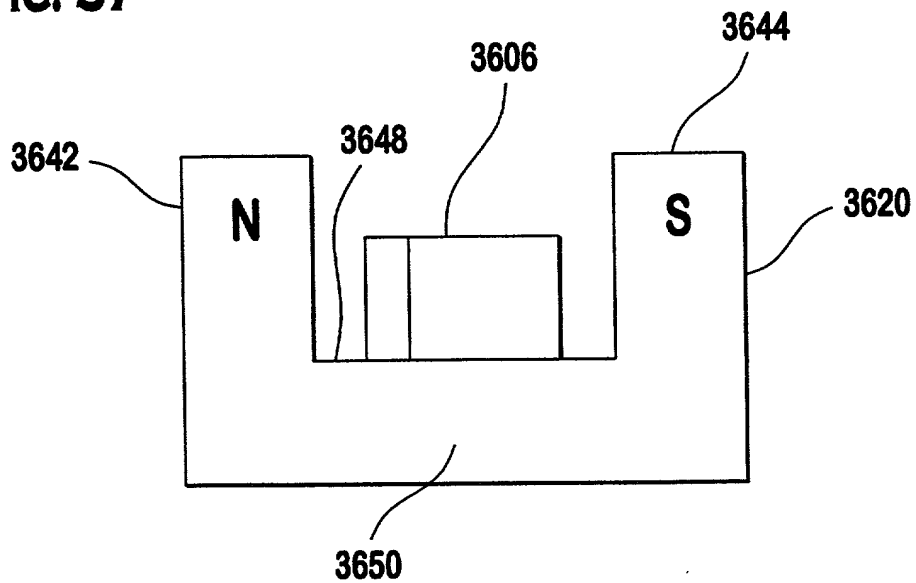


FIG. 37



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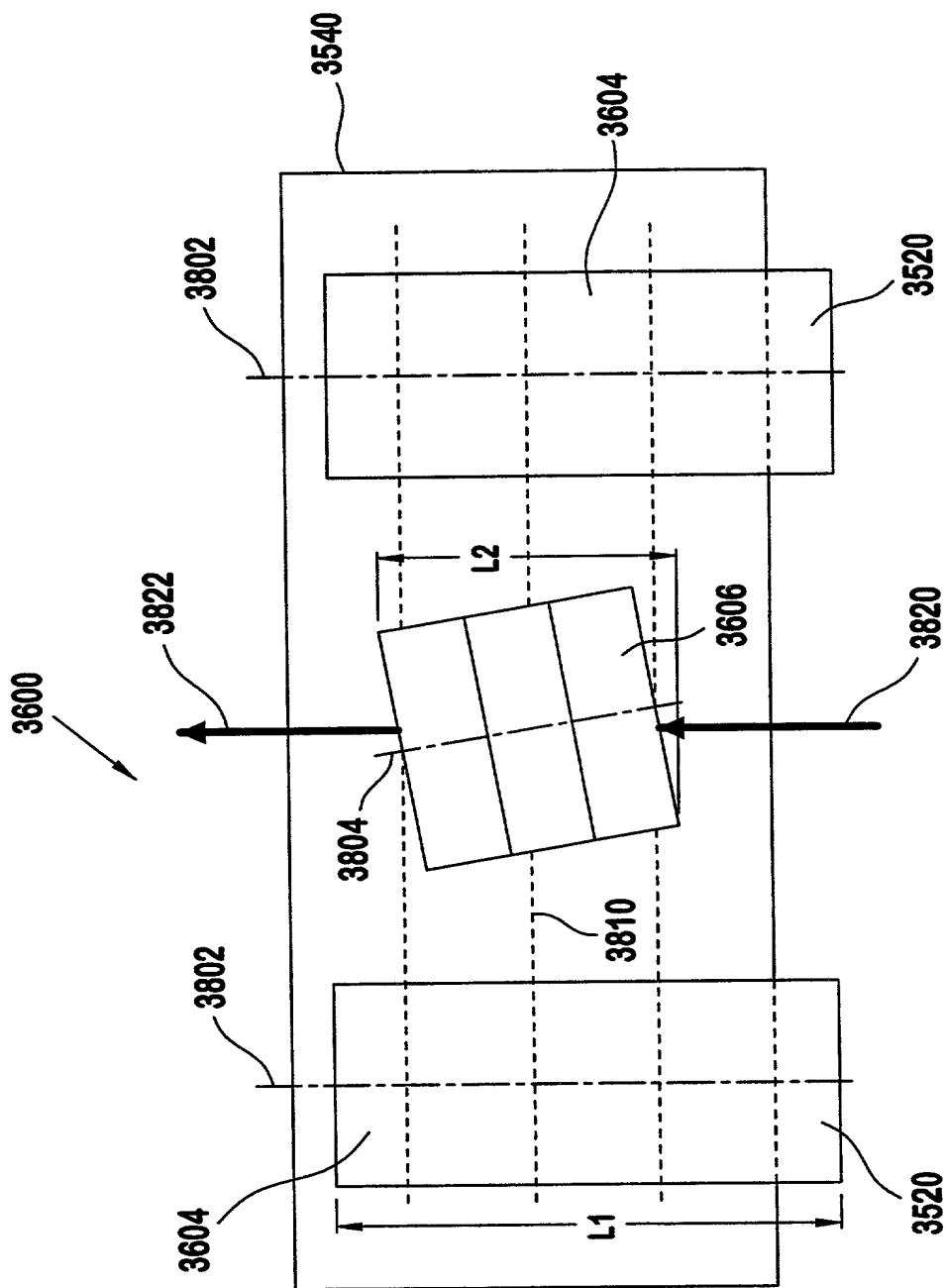
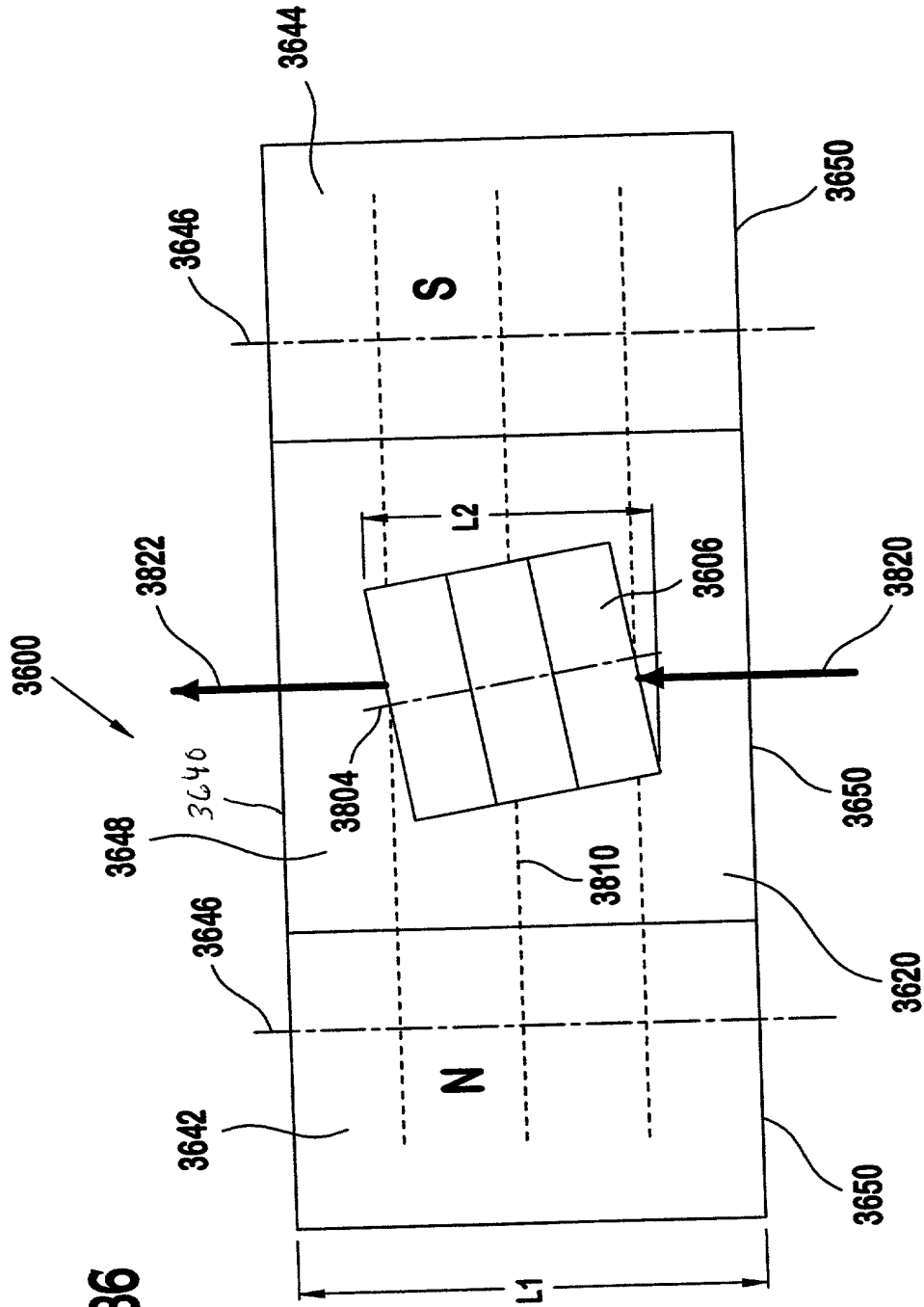


FIG. 35





**Fig. 36**